

C L A I M S

What is claimed is:

1. A distributed ontology system comprising:
 2. a central computer comprising a global ontology directory;
 3. a plurality of ontology server computers, each comprising:
 4. a repository of class and relation definitions;
 5. and
 6. a server for responding to queries relating to class and relation definitions in said repository; and
 7. a computer network connecting said central computer with said plurality of ontology server computers.
1. 2. The system of claim 1 wherein at least one relation definition within an ontology server computer references classes from a different ontology server computer.
1. 3. The system of claim 1 wherein said repositories also contain superclass and subclass relationships.
1. 4. The system of claim 3 wherein at least one superclass and subclass relationship resides on a different ontology server computer than the ontology server computer containing the subclass and the ontology server computer containing the superclass.
1. 5. The system of claim 1 wherein at least one of said plurality of server computers further comprise a publisher for publishing class and relation definitions in said repository to said global ontology directory.
1. 6. The system of claim 1 wherein said central computer further comprises an agent for seeking out class and relation definitions included in said repositories.

The system of claim 1 further comprising an authoring tool for aid repositories.

1 8. The system of claim 7 wherein said authoring tool has the
2 capability to browse repositories of a plurality of ontology server computers.

1 9. The system of claim 7 wherein said authoring tool comprises a
2 validator for ensuring that updates made to said repositories maintain backward
3 compatibility, so that expressions that are currently valid remain valid after the
4 updates are made.

1 10. The system of claim 9 wherein said authoring tool further
2 comprises a class adder for adding new class definitions to said repositories.

1 11. The system of claim 9 wherein said authoring tool further
2 comprises a class editor for editing class definitions in said repositories.

1 12. The system of claim 9 wherein said authoring tool further
2 comprises a relation adder for adding relation definitions to said repositories.

1 13. The system of claim 9 wherein said authoring tool further
2 comprises a relation editor for editing relation definitions in said repositories, by
3 expanding domains of relations.

1 14. The system of claim 1 further comprising a search engine for
2 searching for class or relation definitions.

1 15. The system of claim 14 wherein said search engine resides on at
2 least one of said plurality of ontology server computers.

1 16. The system of claim 14 wherein said search engine resides on
2 said central computer.

1 17. The system of claim 14 further comprising an ontology toolkit
2 comprising:
3 a search tool, for searching said global ontology directory; and

a query tool for querying at least one of said plurality of repositories.

18. The system of claim 1 wherein the class and relation definitions in said repository include authorship data.

19. The system of claim 18 further comprising a web filter for generating a filtered ontology based on constraints on authorship data.

20. The system of claim 1 further comprising a text file embedder for embedding a text file having a description of a class within a repository.

21. The system of claim 1 further comprising an XML embedder for embedding an XML Schema within a designated repository by identifying class and relation definitions implicit in the XML Schema.

22. The system of claim 21 wherein said XML embedder identifies class and relation definitions with aid of a user choosing which classes and relations implicit in the XML Schema are to be included within the designated repository.

23. The system of claim 1 further comprising an XML embedder for embedding an XML Schema within a designated repository by converting the XML Schema into class and relation definitions.

24. The system of claim 23 wherein said XML embedder converts the XML Schema into class and relation definitions with aid of a user choosing which classes and relations implicit in the XML Schema are to be included within the designated repository.

25. The system of claim 1 further comprising a view generator for generating a view of a class by, by associating with the class a subset of attributes of the class.

26. The system of claim 25 wherein the subset of attributes of the class includes composed functions.

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- 1 27. The system of claim 25 wherein at least one attribute in the
2 subset of attributes is further associated with a view of the co-domain of the
3 attribute.
 - 1 28. The system of claim 25 further comprising an XML generator for
2 generating a single XML Schema type element from the view.
 - 1 29. The system of claim 25 further comprising an XML generator for
2 generating an XML Schema from the view.
 - 1 30. The system of claim 29 wherein said XML generator generates
2 an XML Schema with aid of a user choosing which classes and relations are to be
3 included within the XML Schema.
 - 1 31. The system of claim 30 further comprising a class and relation
2 navigation tool for guiding the user in choosing classes and relations.
 - 1 32. The system of claim 25 further comprising a designator for
2 designating classes and relations that are required and for designating classes and
3 relations that are optional.
 - 1 33. The system of claim 1 further comprising a graphical user
2 interface including icons for displaying instances of classes.
 - 1 34. The system of claim 33 further wherein said graphical user
2 interface also includes icons for displaying sets of instances defined by a logical
3 term.
 - 1 35. The system of claim 1 further comprising an ontology navigation
2 tool for viewing class and relation definitions.
 - 1 36. An ontology system comprising:
2 a repository of class and relation definitions;

3 a server for responding to queries relating to class and relation
4 definitions in said repository; and

5 an XML embedder for embedding an XML Schema within said
6 repository by identifying class and relation definitions implicit in the XML
7 Schema.

1 37. The system of claim 36 wherein said XML embedder identifies
2 class and relation definitions with aid of a user choosing which classes and
3 relations implicit in the XML Schema are to be included within the repository.

1 38. An ontology system comprising:
2 a repository of class and relation definitions;
3 a server for responding to queries relating to class and relation
4 definitions in said repository; and
5 an XML embedder for embedding an XML Schema within said
6 repository by converting the XML Schema into class and relation definitions.

1 39. The system of claim 38 wherein said XML embedder converts
2 the XML Schema into class and relation definitions with aid of a user choosing
3 which classes and relations implicit in the XML Schema are to be included within
4 the repository.

1 40. An ontology system comprising:
2 a repository of class and relation definitions;
3 a server for responding to queries relating to class and relation
4 definitions in said repository; and
5 an XML generator for generating an XML Schema from class
6 and relation definitions.

1 41. The system of claim 40 wherein said XML generator generates
2 XML Schema with aid of a user choosing which classes and relations are to be
3 included within the XML Schema.

1 42. The system of claim 41 further comprising an ontology
2 navigation tool for guiding the user in choosing classes and relations.

- 1 43. The system of claim 40 wherein said XML generator converts at
2 least a portion of a class and relation directed graph structure into a tree structure.
- 1 44. The system of claim 40 further comprising a designator for
2 designating classes and relations that are required and for designating classes and
3 relations that are optional.
- 1 45. The system of claim 40 wherein said XML generator comprises
2 an XML embedder for embedding a pre-existing XML Schema within the
3 generated XML Schema.
- 1 46. A distributed ontology method comprising:
2 managing a plurality of repositories of class and relation
3 definitions;
4 managing a global ontology directory; and
5 responding to queries relating to class and relation definitions in
6 at least one repository.
- 1 47. The method of claim 46 wherein at least one relation definition
2 within a repository references classes from a different repository.
- 1 48. The method of claim 47 wherein said repositories also contain
2 superclass and subclass relationships.
- 1 49. The method of claim 48 wherein at least one superclass and
2 subclass relationship resides in a different repository than the repository
3 containing the subclass and the repository containing the superclass.
- 1 50. The method of claim 47 further comprising publishing class and
2 relation definitions in at least one repository to the global ontology directory.
- 1 51. The method of claim 47 further comprising seeking out class and
2 relation definitions included in the repositories.

- 1 52. The method of claim 47 further comprising updating the
2 repositories.
- 1 53. The method of claim 52 further comprising browsing a plurality
2 of repositories.
- 1 54. The method of claim 52 wherein said updating comprises
2 validating that updates made to the repositories maintain backward compatibility,
3 so that expressions that are currently valid remain valid after said updating is
4 performed.
- 1 55. The method of claim 54 wherein said updating further comprises
2 adding new class definitions to the repositories.
- 1 56. The method of claim 54 wherein said updating further comprises
2 editing class definitions in the repositories.
- 1 57. The method of claim 54 wherein said updating tool further
2 comprises adding relation definitions to the repositories.
- 1 58. The method of claim 54 wherein said updating further comprises
2 editing relation definitions in the repositories, by expanding domains of relations.
- 1 59. The method of claim 47 further comprising searching for class or
2 relation definitions.
- 1 60. The method of claim 59 further comprising:
2 searching the global ontology directory; and
3 querying at least one of the plurality of repositories.
- 1 61. The method of claim 47 wherein the class and relation
2 definitions in the repositories include authorship data.

- 1 62. The method of claim 61 further comprising generating a filtered
2 ontology based on constraints on authorship data.
- 1 63. The method of claim 47 further comprising embedding a text file
2 having a description of a class within a repository.
- 1 64. The method of claim 47 further comprising embedding an XML
2 Schema within a designated repository by identifying class and relation
3 definitions implicit in the XML Schema.
- 1 65. The method of claim 64 wherein said identifying comprises user-
2 aided choosing which classes and relations implicit in the XML Schema are to be
3 included within the designated repository.
- 1 66. The method of claim 47 further comprising embedding an XML
2 Schema within a designated repository by converting the XML Schema into class
3 and relation definitions.
- 1 67. The method of claim 66 wherein said converting comprises user-
2 aided choosing which classes and relations implicit in the XML Schema are to be
3 included within the designated repository.
- 1 68. The method of claim 47 further comprising generating a view of
2 a class by, by associating with the class a subset of attributes of the class.
- 1 69. The system of claim 68 wherein the subset of attributes of the
2 class includes composed functions.
- 1 70. The system of claim 68 wherein at least one attribute in the
2 subset of attributes is further associated with a view of the co-domain of the
3 attribute.
- 1 71. The system of claim 68 further comprising generating a single
2 XML Schema type element from the view.

1 72. The system of claim 68 further comprising generating an XML
2 Schema from the view.

1 73. The method of claim 72 wherein said generating comprises user-
2 aided choosing which classes and relations are to be included within the XML
3 Schema.

1 74. The method of claim 73 further comprising navigating through
2 class and relation definitions to guide said user-aided choosing.

1 75. The method of claim 68 further comprising designating classes
2 and relations that are required, and designating classes and relations that are
3 optional.

1 76. The method of claim 47 further comprising displaying icons
2 representing instances of classes.

1 77. The method of claim 76 further comprising displaying icons
2 representing sets of instances defined by a logical term.

1 78. The method of claim 47 further comprising navigating through
2 class and relation definitions.

1 79. An ontology method comprising:
2 . managing a repository of class and relation definitions;
3 . responding to queries relating to class and relation definitions in
4 the repository; and
5 . embedding an XML Schema within the repository by identifying
6 class and relation definitions implicit in the XML Schema.

1 80. The method of claim 79 wherein said identifying comprises user-
2 aided choosing which classes and relations implicit in the XML Schema are to be
3 included within the repository.

- 1 81. An ontology method comprising:
2 managing a repository of class and relation definitions;
3 responding to queries relating to class and relation definitions in
4 the repository; and
5 embedding an XML Schema within the repository by converting
6 the XML Schema into class and relation definitions.
- 1 82. The method of claim 81 wherein said converting comprises user-
2 aided choosing which classes and relations implicit in the XML Schema are to be ..
3 included within the repository.
- 1 83. An ontology method comprising:
2 managing a repository of class and relation definitions;
3 responding to queries relating to class and relation definitions in
4 the repository; and
5 generating an XML Schema from class and relation definitions.
- 1 84. The method of claim 83 wherein said generating comprises user-
2 aided choosing which classes and relations are to be included within the XML
3 Schema.
- 1 85. The method of claim 84 further comprising navigating through
2 class and relation definitions to guide said user-aided choosing.
- 1 86. The method of claim 83 wherein said generating comprises
2 converting at least a portion of a class and relation directed graph structure into a
3 tree structure.
- 1 87. The method of claim 83 further comprising designating classes
2 and relations that are required, and designating classes and relations that are
3 optional.
- 1 88. The method of claim 83 wherein said generating comprises
2 embedding a pre-existing XML Schema within the generated XML Schema.

- 1 89. An ontology system comprising:
2 a global ontology directory;
3 a plurality of repositories of class and relation definitions; and
4 a server for responding to queries relating to class and relation
5 definitions in said repositories.
- 1 90. The system of claim 89 wherein at least one relation definition
2 within a repository references classes from a different repository.
- 1 91. The system of claim 90 wherein said repositories also contain
2 superclass and subclass relationships.
- 1 92. The system of claim 91 wherein at least one superclass and
2 subclass relationship resides in a different repository than the repository
3 containing the subclass or the repository containing the superclass.
- 1 93. The system of claim 90 further comprising a publisher for
2 publishing class and relation definitions in at least one of said repositories to said
3 global ontology directory.
- 1 94. The system of claim 90 further comprising an agent for seeking
2 out class and relation definitions included in said repositories.
- 1 95. The system of claim 90 further comprising an authoring tool for
2 updating said repositories.
- 1 96. The system of claim 95 wherein said authoring tool has the
2 capability to browse a plurality of repositories.
- 1 97. The system of claim 96 wherein said authoring tool comprises a
2 validator for ensuring that updates made to said repositories maintain backward
3 compatibility, so that expressions that are currently valid remain valid after the
4 updates are made.

- 1 98. The system of claim 97 wherein said authoring tool further
2 comprises a class adder for adding new class definitions to said repositories.
- 1 99. The system of claim 97 wherein said authoring tool further
2 comprises a class editor for editing class definitions in said repositories.
- 1 100. The system of claim 97 wherein said authoring tool further
2 comprises a relation adder for adding relation definitions to said repositories.
- 1 101. The system of claim 97 wherein said authoring tool further
2 comprises a relation editor for editing relation definitions in said repositories, by
3 expanding domains of relations.
- 1 102. The system of claim 90 further comprising a search engine for
2 searching for class or relation definitions.
- 1 103. The system of claim 102 further comprising an ontology toolkit
2 comprising:
3 a search tool, for searching said global ontology directory; and
4 a query tool for querying at least one of said plurality of
5 repositories.
- 1 104. The system of claim 90 wherein the class and relation definitions
2 in said repository include authorship data.
- 1 105. The system of claim 104 further comprising a web filter for
2 generating a filtered ontology based on constraints on authorship data.
- 1 106. The system of claim 90 further comprising a text file embedder
2 for embedding a text file having a description of a class within a repository.
- 1 107. The system of claim 90 further comprising an XML embedder
2 for embedding an XML Schema within a designated repository by identifying
3 class and relation definitions implicit in the XML Schema.

1 108. The system of claim 107 wherein said XML embedder identifies
2 class and relation definitions with aid of a user choosing which classes and
3 relations implicit in the XML Schema are to be included within the designated
4 repository.

1 109. The system of claim 90 further comprising an XML embedder
2 for embedding an XML Schema within a designated repository by converting the
3 XML Schema into class and relation definitions.

1 110. The system of claim 109 wherein said XML embedder converts
2 the XML Schema into class and relation definitions with aid of a user choosing
3 which classes and relations implicit in the XML Schema are to be included within
4 the designated repository.

1 111. The system of claim 90 further comprising a view generator for
2 generating a tree of attributes from class and relation definitions.

1 112. The system of claim 111 wherein said view generator is an XML
2 generator for generating an XML Schema from class and relation definitions.

1 113. The system of claim 112 wherein said XML generator generates
2 an XML Schema with aid of a user choosing which classes and relations are to be
3 included within the XML Schema.

1 114. The system of claim 113 further comprising a class and relation
2 navigation tool for guiding the user in choosing classes and relations.

1 115. The system of claim 111 further comprising a designator for
2 designating classes and relations that are required, and for designating classes and
3 relations that are optional.

1 116. The system of claim 90 further comprising a graphical user
2 interface including icons for displaying instances of classes.

1 117. The system of claim 116 further wherein said graphical user
2 interface also includes icons for displaying sets of instances defined by a logical
3 term.

1 118. The system of claim 90 further comprising an ontology
2 navigation tool for viewing class and relation definitions.